

الاختبار الثاني

جامعة الملك سعود

الفصل الثاني 1430 / 1431

كلية العلوم

مقرر 145 احص

قسم الإحصاء وبحوث العمليات

الوقت 10.30-11.30

(A)

الائتين 3 / 6 / 1431 هـ

اسم الطالبة : .....

رقم الطالبة : .....

رقم الشعبة : ..... رقم التسلسل : .....

أستاذة المقرر : .....

Question	1	2	3	4	5	6	7	8	9	10
Answer										

Question	11	12	13	14	15	16	17	18	19	20
Answer										

Question	21	22	23	24	25
Answer					

**Good Luck**

**Question 1:**

The following table represents the probability distribution of the number of decayed teeth for children aged 5. If we randomly choose a child and using the following table, then :

<b>X</b>	<b>P(X=x)</b>
<b>0</b>	<b>0.1</b>
<b>1</b>	<b>0.4</b>
<b>2</b>	<b>0.3</b>
<b>3</b>	<b>0.1</b>
<b>4</b>	<b>0.05</b>
<b>5</b>	<b>0.05</b>

1)  $P(X < 2) =$

- (a) 0.5            (b) 0.8            (c) 0.2            (d) 0.3            (e) none of these

2)  $P(X = 3) =$

- (a) 0.05            (b) 0.1            (c) 0.9            (d) 0.2            (e) none of these

3)  $P(2.5 \leq X \leq 4) =$

- (a) 0.15            (b) 0.4            (c) 0.45            (d) 0.60            (e) none of these

4)  $P(X = 1.6) =$

- (a) 1            (b) 0            (c) 0.4            (d) 0.1            (e) none of these

5)  $P(X \leq 7.5) =$

- (a) 1            (b) 0            (c) 0.4            (d) 0.1            (e) none of these

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**Question 2:**

In a large population of people, 15% have high blood pressure. If we randomly choose 8 people and let

X = the number of people that have high blood pressure in this sample, then:

6) The probability distribution of X, is  $P(X = x) =$

- (a)  $\binom{8}{x} (0.15)^x (0.85)^{8-x}$             (b)  $\binom{15}{x} (0.08)^x (0.92)^{15-x}$             (c)  $\binom{8}{x} (0.85)^x (0.15)^{8-x}$

- (d)  $e^{-15} (15)^x / x!$             (e)  $e^{-8} (8)^x / x!$

7) The values that  $x$  takes are:

- (a) 1,2,...,8      (b) 1,2,...,15      (c) 0,1,...,85      (d) 0,1,...,8      (e) 0,1,..., $\infty$

8)  $P(X = 3) =$

- (a) 0.9161      (b) 0.6141      (c) 0.0839      (d) 0.0026      (e) none of these

9) The probability that at most there is one person that have high blood pressure =

- (a) 0.3847      (b) 0.6572      (c) 0.3429      (d) 0.6153      (e) none of these

10) The standard deviation of  $X =$

- (a) 1.4      (b) 0.1275      (c) 64      (d) 1.02      (e) none of these

### **Question 3:**

A medical research team wished to evaluate the effectiveness (فعالية) of a cancer test. This test was given to a random sample of 800 patient with cancer and another independent random sample of 500 person having no cancer. The results are as follows:

<b>Diagnosis</b> <b>Test Result</b>	<b>Yes (D)</b>	<b>No (<math>\bar{D}</math>)</b>	<b>Total</b>
<b>Positive (T)</b>	<b>770</b>	<b>60</b>	<b>830</b>
<b>Negative (<math>\bar{T}</math>)</b>	<b>30</b>	<b>440</b>	<b>470</b>
<b>Total</b>	<b>800</b>	<b>500</b>	<b>1300</b>

11) What is a false negative?

- (a) Test indicates a negative result while the person does not have the disease  
(b) Test indicates a positive result while the person has the disease  
(c) Test indicates a positive result while the person does not have the disease  
(d) Test indicates a negative result while the person has the disease  
(e) None of these

12) The sensitivity of the test is

- (a) 0.592 (b) 0.88      (c) 0.471      (d) 0.9625      (e) none of these

13) Suppose that the rate of the disease in the general population is 0.1. Find the predictive value positive of the test.

- (a) 0.592      (b) 0.88      (c) 0.471      (d) 0.9625      (e) none of these
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**Question (4):**

**(\*) If Z has the standard normal distribution, then**

14)  $P(Z=2.75) =$

- (a) 0.9970      (b) 0.0030      (c) 0.9949      (d) 0      (e) none of these

15)  $P(Z < -1.65) =$

- (a) 0.0012      (b) 0.9505      (c) 0.9987      (d) 0.0495      (e) none of these

16)  $P(Z \geq 2.32) =$

- (a) 0.8989      (b) 0.1011      (c) 0.9898      (d) 0.0102      (e) none of these

17)  $P(Z > z) = 0.0197$  , then  $z =$

- (a) 2.06      (b) -2.60      (c) -2.06      (d) 2.60      (e) none of these

18)  $P(-0.73 < Z < z) = 0.4997$  , then  $z =$

- (a) -0.62      (b) 0.62      (c) 0.2670      (d) 0.7324      (e) none of these

19) The Normal distribution is completely determined by the parameters:

- (a)  $\lambda$       (b)  $n, p$       (c)  $n, q$       (d)  $\mu, \sigma$       (e) none of these
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**(\*\*) The distribution of the time (in days) that a patient recovers from rare blood disease follows the normal distribution with mean 40 and standard deviation 5.**

**Thus:**

20) The probability that the patient takes from 30 to 40 days to recover is:

- (a) 0.9987      (b) 0.0013      (c) 0.4772      (d) 0.0228      (e) none of these

- 21) The probability that the patient takes more than 55 days to recover is:  
(a) 0.9987      (b) 0.0013      (c) 0.4772      (d) 0.0228      (e) none of these
- 22) The variance is:  
(a) 10      (b) 2.5      (c) 25      (d) 5      (e) none of these
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**Question (5):**

(\* ) Suppose that over a period of several years the average number of deaths from heart attack has been 8. If the number of deaths from this reason follows the Poisson distribution. Then:

- 23) The probability that 10 deaths will occur during this year is:  
(a) 0.98625      (b) 0.31035      (c) 0.01375      (d) 0.09926      (e) none of these
- 24) The probability that at least 3 deaths will occur during this year is:  
(a) 0.98625      (b) 0.31035      (c) 0.01375      (d) 0.09926      (e) none of these
- 25) The mean of deaths will occur with heart disease during this year is:  
(a) 2.2824      (b) 64      (c) 8      (d) 2.8284      (e) none of these
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*End of questions*